How do Quality of Teaching, Assessment and Feedback Drive Undergraduate Course Satisfaction in UK Business Schools? A Comparative Analysis with Non-Business School Courses using the UK National Student Survey

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Abstract:

How does quality of teaching, assessment and feedback influence satisfaction with overall course quality for students taking business school undergraduate courses in the UK? Are these teaching related determinants of satisfaction in business school (BS) courses different to those in non-business school courses (NBS)? These questions currently figure prominently in UK higher education owing to the introduction of a 'Teaching Excellence Framework', linking student fee increases to levels of reported student satisfaction. The elevation of student satisfaction as a determinant of higher education delivery raises important questions about the possible longer term consequences for teaching practices. To explore these, we test three sets of hypotheses relating to how teaching, assessment and feedback quality affects satisfaction in the business school context, as well as comparative differences (i.e. BS versus NBS students). We draw from over one million responses recorded in the UK's National Student Survey. We find questions related to perceived teaching quality are important satisfaction drivers for BS students. In terms of differences with NBS students, we find intellectual stimulation appears of lesser importance to BS students, whereas fair assessments are of greater importance. BS students, we argue, exhibit a stronger orientation towards 'instrumental' learning. We consider policy implications.

Key words: Module evaluation, MEQ, student satisfaction, TEF, business school, regression analysis.

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Introduction

This research was motivated by: (i) a curiosity to better understand the drivers of reported course satisfaction for undergraduate business school (BS) students, particularly teaching, assessment and feedback related ones; and (ii) to explore whether and in what ways these determinants differ from students taking non-business school (NBS) subjects. Point (i) is of growing practical importance to all business schools (and universities) – not just in the UK. The UK is our focus, however, because the UK government has recently introduced a Teaching Excellence Framework (hereafter TEF) with the aim of making universities more accountable to students for the fees they charge. Student fee increases are to become increasingly conditional upon meeting reported student satisfaction levels, particularly those reported in the UK's National Student Survey (hereafter NSS), a comprehensive nationwide survey sent to all undergraduates shortly after completion of their courses. Universities that perform poorly in the TEF will be unable to raise fees. Some may even see them decreased. Our analysis is of interest outside the UK because the growing marketization of higher education across the globe is placing considerable pressure on all universities to raise reported satisfaction levels.

Despite the increased elevation of student satisfaction as an influence on education delivery in UK universities, we still have comparatively little systematic empirical evidence on what drives overall student satisfaction in business schools (or universities as a whole). To date, studies on student satisfaction tend to be found in policy related reports and usually focus on bivariate statistical associations (Buckley, Soilemetzidis, & Hillman, 2015). Such analyses are unable to discriminate between the strongest and weakest drivers of *overall* reported satisfaction. Similarly, BS and university administrators have tended to take rather ad-hoc, informal approaches to analyse student satisfaction data (Williams & Mindano, 2015). For example, UK universities have identified the quality and timeliness of assessment and feedback as receiving comparatively low NSS scores *vis a vis* other questions on the survey. New approaches have

therefore been put in place to improve assessment and feedback mechanisms in many UK universities, with a view to increasing satisfaction levels (Williams & Mindano, 2015). However, little is really known about how improved assessment and feedback impacts *overall* course satisfaction. While it may be an essential component of good pedagogic practice – what impact does it *actually have* on reported course quality? And how important is it when compared with other teaching related drivers – such as the fairness of assessments, staff enthusiasm or intellectual stimulation? To explore these questions multivariate regression analysis, ideally using larger datasets, can potentially provide further insights.

Having a more informed understanding of what drives course satisfaction is important for several reasons. Firstly, universities which crack the secret of securing high overall student satisfaction rates will, most likely, outperform others (Corduas et al., 2016). Via competitive evolutionary market driven processes (spurred by government policy) they will become more financially successful and grow faster. The models and practices they adopt, for better or worse, will become more influential and diffuse widely. At a practical level, of course, this means better understanding what drives student satisfaction will become crucial for senior BS administrators looking to improve their institutions' financial performance. In turn, frontline teaching staff, as they negotiate their career progression in response to the incentive structures placed before them (i.e. an increasing emphasis on reported student satisfaction), will become more preoccupied with satisfying student demands. Secondly, linked to the above but arguably much more important, it could be that some of the positive teaching, assessment and feedback related drivers of student satisfaction are in themselves antithetical to, or incompatible with, student learning and intellectual development. For example, it might be that lowering academic standards increases reported satisfaction. Or, alternatively, it could be that some teaching approaches, ones which genuinely are linked to student learning, actually register as being less important (or in the worst case scenario, completely unimportant) as drivers of reported

satisfaction. Timely and detailed assessment feedback, for example, while arguably central to student learning, does not register as a significant driver of overall course satisfaction in our results (based on 1.6 million NSS responses). Will this lead to the gradual relegation of educationally sound assessment and feedback practices in business schools? In an increasingly competitive, market driven higher education system, might business schools and those that staff them simply become more concerned with reported student satisfaction than the genuine educational development of their students? Without further systematic empirical research into the underlying drivers of student satisfaction we cannot be certain whether blindly following a consumer centric market driven path will actually be good for longer-term student learning and development.

In relation to our second research question, to establish if the determinants of satisfaction differ between BS students and those taking NBS subjects, understanding the unique features of the specific drivers of BS student satisfaction is interesting for several additional reasons. Firstly, business schools are typically large income generating units, though they are usually integrated within fairly centralized university structures. University senior management may be drawn from other university schools and departments and may lack familiarity with the specific needs of BS students. Comparative analysis of reported satisfaction drivers can shed further light on the *specific* characteristics of BS students. Secondly, and again much more importantly, BS students are arguably at the front line of the marketization process in UK higher education. They are on the whole, we contend, more inclined to view their higher education degree programmes as investments related to career progression and life time earnings than their NBS peers. As such, they are more likely to perceive themselves as *consumers* of higher education. This could influence their approach to learning and in turn their perceptions of educational quality. Instrumental learning, for example, which describes the idea of studying primarily for the sake of efficiently passing exams and gaining marketable qualifications – and not out of an

interest or curiosity to better understand a subject - is considered common in UK business schools (Ottewill, 2003). So can we pick up a more consumer driven, instrumental orientation in BS students in the UK NSS data? Looking at comparative differences between BS and NBS students may provide glimpses into the ways in which perceptions of educational quality may evolve in response to increased marketization of higher education.

Interestingly, our findings comparing BS and NBS teaching, assessment and feedback related drivers of overall satisfaction do suggest there are important differences between BS and NBS students: intellectual stimulation, for example, is a less important driver for BS students; fair assessment and clarity of explanation, by contrast, is more important. These differences appear broadly consistent with a more instrumental outlook. They raise the question of whether BS educators should simply accept this – or try and do something about it. Of additional concern, moreover, is the aforementioned finding of insignificant relationships between quality of assessment and feedback and reported satisfaction. Government policy-makers in the UK may have to think more carefully about such relationships when crafting the TEF. Similarly, BS administrators and educators must consider whether blind pursuit of high student satisfaction ratings is always in the best interests of their students. If it were to relegate in importance the quality of assessment and feedback practices, it may not be.

We first outline two sets of hypotheses regarding the likely strength of teaching, assessment and feedback related drivers of BS reported student satisfaction. The first set focuses on teaching, the second on assessment and feedback. Our underlying presumption is that these drivers, in general, should be important positive drivers of satisfaction. After this, we propose three further hypotheses regarding possible differences in these teaching, assessment and feedback related drivers that may be found between BS and NBS students.

What drives reported student satisfaction in BS subjects?

There is a long history of studies that empirically explore the various drivers of student satisfaction, mostly published in education related journals. We draw from these studies, as they provide direct insights into the focus of our study. Like ours, these papers predominately use student evaluation data (Broder & Dorfman, 1994; Hearn, 1985; Krahn & Bowlby, 1997; Nadiri, Kandampully, & Hussain, 2009; Neumann & Neumann, 1981; Rienties, Li, & Marsh, 2015). Such studies have been undertaken at a number of different levels of analysis. For example, some consider evaluations of entire courses, programmes or the university experience (Filak & Sheldon, 2003; Rienties et al., 2015); some module satisfaction (Broder & Dorfman, 1994; Dolinicar & Grun, 2009; Rienties et al., 2015); others are more niche and look at determinants of curriculum satisfaction (Tessema, Ready, & Yu, 2012).

There is considerable research on the determinants of satisfaction in specific subjects, or fields. This includes studies on drivers of satisfaction in psychology (Green, Hood, & Neumann, 2015), sports sciences (Popp, Weight, Dwyer, Morse, & Baker, 2015), music (Serenko, 2011) and also a number in BS related courses. Indeed, we identified eight BS related studies, making it the most studied subject area (Bennett, 2003; DeShields, Kara, & Kaynak, 2005; Douglas, Douglas, McClelland, & Davies, 2014; Estami, 2014; Hill, Lomas, & MacGregor, 2003; Letcher & Neves, 2010; Malik, Danish, & Usman, 2010; Shurden, Santandreu, & Shurden, 2016). The focus of most studies is at the undergraduate level, involving US and UK based students (Bennett, 2003; Douglas et al., 2014) although other countries have been studied (e.g. Greece (Nadiri et al., 2009), Pakistan (Malik et al., 2010) and the UAE (Dodeen, 2016)). A central question the above studies look to address is: what are *most and least* important drivers of overall student satisfaction with teaching? Or, as Hearn (1985) puts it in one of the earliest studies on this topic: "how do students weight the various domains of satisfaction and

dissatisfaction (e.g. faculty availability, faculty teaching ability) in arriving at their levels of overall program satisfaction?" (Hearn, 1985, p.415).

Following this literature, we propose a set of hypotheses on the relative importance of the teaching, assessment and feedback related determinants of course satisfaction for BS subjects. We develop them around the eight questions found in the two general categories used in the UK NSS of teaching effectiveness and assessment and feedback (the other four categories are: academic support; course organisation and management; learning resources; and personal development; see NSS questionnaire, Table 2). Moreover, as we wish to inform academics, deans of business schools and government policy-makers about the relative importance of these teaching related drivers of satisfaction, we incorporate the use of the labels "strong", "moderate" and "weak". These refer to the importance of each driver as determined by their ranking positions *vis a vis* all other drivers (i.e. explanatory variables in our model). "Strong" refers to a driver ranked in the upper quartile of all drivers, "weak" the bottom quartile and "moderate" all else in between.

Course teaching as a determinant of satisfaction

Empirical research on general student satisfaction has typically (and perhaps unsurprisingly) found a strong (i.e. comparatively large coefficient in the empirical regression analysis) and statistically significant relationships between survey questions gauging various aspects of teaching quality and overall course satisfaction (DeShields et al., 2005; Hearn, 1985; Krahn & Bowlby, 1997; Letcher & Neves, 2010; Thomas & Galambos, 2004). Hearn (1985), for example, found especially strong effects "from indicators of teaching ability" (Hearn, 1985, p.421). Subsequently, Krahn and Bowlby (1997) found teaching quality to be important: "our study demonstrates much more conclusively that the experience of good teaching translates into greater satisfaction with the overall university experience" (Krahn & Bowlby, 1997, p.171). Green et al. (2015) confirm this viewpoint in their summary of the literature on course

satisfaction: "Teaching variables, particularly teaching quality and expertise, tend to show the strongest relationships with student satisfaction" (Green et al., 2015, p.131).

Looking specifically at studies on BS student satisfaction, teaching quality similarly emerges as an important determinant (Gibson, 2010). Bennett (2003), for example, looking at satisfaction levels in one UK business school, confirms the "critical importance of teaching quality as a determinant of student satisfaction" (Bennett, 2003, p.137). Deshields et al. (2005), looking at a US business school, finds faculty and classes as "key factors" in influencing satisfaction (p.137), as do Neves and Letcher (2010). In general, the literature on student satisfaction suggests teaching quality has a strong positive influence on satisfaction, which is perhaps unsurprising. What particular aspects of teaching quality, however, are most important to students? In this regard, the current literature lacks detail. The methodologies employed often use somewhat broad survey questions. Within the UK NSS, however, there is a comparatively fine level of detail. There are four questions, for example, related to teaching quality (in the first section of the NSS). While we cannot be certain which aspects of teaching are most important for students, based on the findings of existing empirical research, we predict each of these to have a potentially strong positive impact on overall reported student satisfaction. This is based on the general finding of a strong positive relationship for teaching questions as a whole.

H1a: Staff that are good at explaining things will have a <u>strong</u> and positive impact on overall satisfaction with course quality for BS students.

H1b: Staff that make the subject matter interesting will have a <u>strong</u> positive impact on overall satisfaction with course quality for BS students.

H1c: Staff that are enthusiastic about what they are teaching will have a <u>strong</u> positive impact on overall satisfaction with course quality for BS students.

H1d: Intellectual stimulation is a strong determinant of overall satisfaction with course quality for BS students.

Impact of assessment and feedback on course satisfaction

Studies focussing on the determinants of student course satisfaction are not very clear on the impacts of assessment and feedback quality on course satisfaction. Hearn (1985), for example, has no instrument to gauge impacts of assessment and feedback. Similarly, many later studies lack coverage of assessment and feedback (Athiyaman, 1997; Broder & Dorfman, 1994). Krahn & Bowlby (1997) have a questionnaire item on feedback ("instructors provided helpful feedback throughout courses"). However, they use factor analysis to create a single generalised "teaching environment" variable (composed of nine questions). The specific impact of different elements of assessment and feedback, therefore, cannot be isolated. The first NSS survey question relates to the clarity of marking criteria. In the overall scheme of an undergraduate course we suspect this to have a rather limited impact on overall satisfaction.

H2a: Clear marking criteria are a weak driver of course satisfaction for BS students.

Rientes, et al. (2015), in one of few useful studies in the area of assessment and feedback, (but looking at module, not course level satisfaction) found that assessment considerations were the second most important driver of overall learning satisfaction (Rienties et al., 2015, p.13). Kandiko and Mawer (2013) using multiple focus group discussions, found that the perception of thoroughness and fairness in the assessment process was important to all UK students. We suspect these findings may translate to the course or program level and hypothesise that concern with fairness of assessments and marking processes are likely to play at least a moderate role in shaping satisfaction.

H2b: Fair assessment and marking arrangements are a moderate driver of course satisfaction for BS students.

Summative and formative assessment feedback, as mentioned, is not covered in most of the empirical studies of satisfaction determinants. Formative coursework should, in theory, strongly facilitate learning. If learning is important to the formation of satisfaction with quality it should strongly drive satisfaction. This being said, the volume of such feedback is often limited and feedback, it is further suggested, is often poorly understood by students (Kandiko & Mawer 2013; Weaver, 2006). In the context of all other potential factors, we hypothesize feedback quality and timeliness therefore has at most a moderate impact on course satisfaction. The final three questions of section two of the UK NSS deal with these aspects of feedback delivery.

H2c: Timeliness of feedback on assessments is a moderate driver of overall course satisfaction for BS students.

H2d: The detail of feedback on assessments is a moderate driver of overall course satisfaction for BS students.

H2e: Feedback which helps clarify misunderstandings is a moderate driver of overall course satisfaction.

How do the teaching, assessment and feedback drivers of reported student satisfaction vary between BS and NBS courses?

How do the weights on teaching, assessment and feedback related satisfaction drivers vary between BS and NBS students? These differences - referred to in the pedagogic literature as "field differences" - have been found to vary across different academic fields (Hearn, 1985).

We now develop three hypotheses related to the potential field differences between BS and NBS related.

Within the pedagogic literature students have been thought of as adopting either a deep or a surface approach to their learning (Marton & Saljo, 1976). Deep learning involves attempting to understand underlying concepts and ideas to find meaning. It implies high levels of intellectual engagement with a subject. Rather than simply learning for extrinsic reasons (to pass tests, meet targets and gain qualifications) deep learners are motivated by intrinsic reasons such as a desire to find enlightenment via improved conceptual understanding (Lucas & Myer 2005, Entwistle & Tate 1990). So called instrumental learning has some similarities to surface and strategic learning (Dyer & Hurd, 2016; Prosser & Trigwell, 1999) but is more focussed on desired outcomes, namely to attain a good degree (Ottewill, 2003). Some evidence suggests students have a preference towards BS related subjects for extrinsic reasons. For example, to improve starting salary prospects by possessing a good degree from a good university. To do so, it has been suggested, they may be more prone to adopting an approach that is focussed on achieving grades rather than mastering the subject (Ottewill & McFarlane 2001; Neves & Hillman 2016, Koris, Ortenblad, & Ojala, 2016). A lot of management learning literature focuses on the unique characteristics of BS students (Wang, Malhotra, & Murnighan, 2011). In particular, BS students are considered more strongly driven by self-interest and personal gain than other students (Arieli et al. 2015). As such, a tendency towards "instrumental" learning has been identified in the BS context (Ottewill & MacFarlane, 2003; Rynes, Lawson, Ilies, & Trank, 2003). Thus, a starting point for developing hypotheses on the differences between drivers of satisfaction in BS and NBS students is that the former are, on the whole, more likely than the latter to adopt an instrumental approach to their studies than the rest of the general UK student population (Ottewill, 2003; Ottewill & MacFarlane, 2003). This, in turn, may shape their perception of teaching quality.

It is suggested instrumental learners show "antipathy towards subjects that are not self-evidently relevant or make considerable intellectual demands" (Ottewill, 2003, p.189). Looking at specific teaching items on the UK NSS questionnaire (see Table 3) we might predict BS students may be less concerned with intellectual stimulation when taking their degree programmes (question 4).

H3a: Intellectual stimulation is a <u>weaker</u> driver of satisfaction in BS than NBS students.

Instrumental learners also have "a high degree of dependence on tutors" (Ottewill, 2003, p.189). We might also predict BS students to be more concerned with receiving clear, practical instructions about how to cover course materials and successfully complete their course. This is because they may prefer being given solutions or answers to questions rather than discovering and creating meaning for themselves. We hypothesise therefore that BS students place a higher premium on clear explanations (NSS question 1) but attach lesser importance to intellectual stimulation.

H3b: Clarity of explanation is a <u>stronger</u> driver of satisfaction in BS than NBS students.

BS students may wish to obtain knowledge of how to do business and gain qualifications that can lead to employment or better business opportunities. An overriding purpose of attending university is to achieve a positive outcome, namely a good degree which may lead to a good job. This instrumental approach, it has been suggested, leads to: "an unhealthy preoccupation with summative assessment" in BS students (Ottewill, 2003, p.189). As a result, their sensitivity to assessment processes may well be more acute than students studying other subjects. This leads to our final hypothesis.

H3c: Fair assessment and marking is a <u>stronger</u> driver of student satisfaction in BS than NBS students.

Methods

Following similar approaches used in earlier student satisfaction studies, regression analysis was employed to explore the statistical significance as well as the relative magnitudes of student satisfaction determinants (Hearn, 1985; Krahn & Bowlby, 1997; Nadiri et al., 2009; Rienties et al., 2015; Tessema et al., 2012). We use OLS and include all 21 items from the six UK NSS categories, including eight questions on teaching, assessment and feedback as explanatory variables. By doing so, we can attempt to decompose the impacts of specific explanatory variables, following the approach used by others (Hearn, 1985; Krahn & Bowlby, 1997). We do not, therefore, initially look to employ factor analysis for the purpose of creating composite variables (for further exploration of the data, however, we do - see later discussion section). An advantage of this approach is that is allows us to explore in more specific detail individual drivers of satisfaction.

We use pooled data from five years of the UK NSS (2012-2016). We focus on all full-time students.[1] We used the averages of all 22 NSS questions for course level responses for all completed student responses undertaken at an institutional level. These items are ordered into six NSS general categories (see Tables 2 and 3). The questions use a five-point Likert scale (1=strongly disagree, 5=strongly agree) and are only publishable if there are at least 10 responses with a response rate of greater than or equal to 50% for each course. The NSS involves approximately 275 UK higher education institutions annually reporting around 4,000 final average course subject level evaluations at the Joint Academic Coding System (JACS) subject level two.[2] We use the JAC level 2 level of disaggregation as it allows us to identify all institutions offering business school related subjects. Here we use the categories of "business" (JAC code 25), "management" (26), "economics" (19), "finance and accounting" (27) and

[1] We did not include part-time students as the available sample of respondents is considerably smaller.
[2] JACs is used by the UK Higher Education Statistics Agency and the Universities and Colleges Admissions Service (UCAS) to categorise academic subjects.

"Tourism, Transport, Travel and others in Business and Administrative studies" (28) to represent BS related courses (i.e. subjects often taught within business schools). Of the 20,054 institutional responses reported over the five year period 2,887 were BS related courses. We converted the reported percentage shares of respondents to the 22 standard questions (using the 1-5 Likert scale) of the survey into a final average figure, ranging from 1 to 5 (for each of the 22 questions). Thus, for each variable an average score for each course by institution, ranging from theoretical minimum of 1 to a maximum of 5, was obtained (Table 3).

**** TABLE 1 ABOUT HERE****

Our dependent variable, similar to Lenton's (2015) study, is NSS question 22, "Overall, I am satisfied with the quality of the course", averaged for each course (at JAC level 2) by each institution. Independent variables included in our study are NSS questions 1-21 (see Table 3) plus year dummy variables and a BS related subject dummy variable. Additionally, following Hearn's (1985) standard econometric approach for testing differences between coefficients, business school interaction dummy variables are introduced. The business school dummy is classified as one if it falls into JAC level 2 categories 19, 25, 26, 27 or 28. We do not standardise the data as in other studies (Broder & Dorfman, 1994; Hearn, 1985), as all variables use identical Likert scales. We run the model using the BS sample (1), the NBS sample (2) and the combined full sample (3). Using the business related subject dummy variable we then create a further 21 dummy interaction terms for each of the explanatory variables and introduce them (labelled as "Interactions" in Table 2) along with the intercept dummy in the full sample. This allows us to statistically test for "field differences" between the magnitudes of the different coefficients on each of the explanatory variables for BS and NBS groups (Hearn, 1985). If the interaction coefficient is significant, it suggests the impact the given explanatory variable differs between BS and NBS groups. We drop insignificant interaction terms, testing them individually and finally as a group simultaneously.

As noted, for our first and second group of hypotheses we classify categories as "strong" if they are in the upper quartile by coefficient ranking or "weak" if in the lower quartile by rank. "Moderate" lies in between (see Table 6).

Likert scales and use of OLS

The question of whether the sample averages of Likert scale responses can be meaningfully employed using OLS regression analysis is debated. Ideally, of course, we would use ordered logit modelling using the 1.6 million individual student responses. These data, however, are not publicly available. On the one hand, some argue parametric tests cannot be used on Likert scales or their averages, as the underlying responses are non-parametric, based as they are on ordinal, not interval, data (Jamieson, 2004). On the other hand, however, it has been forcefully argued that such critics misunderstand parametric testing and that OLS can be employed on Likert averages. Non-normality and skewness typical with Likert data, for example, are not an issue: parametric statistics assume normality in distribution of sample means, following the Central Limit Theorem, not the data itself. In practice, moreover, it is found Pearson correlation is "robust with respect to skewness and non-normality" (Norman, 2010, p.629). Converting ordinal data to interval data, via for example the addition of different ordinal responses (as we do) is, moreover, theoretically justifiable (Norman, 2010). Norman (2010) concludes: "Parametric statistics can be used with Likert data, with small sample sizes, with unequal variances, and with non-normal distributions with no fear of "coming to the wrong conclusion". These findings are consistent with empirical literature dating back nearly 80 years" (Norman, 2010, p.631).

In short, the use of OLS on averages of Likert scales is commonly used across a broad range of academic disciplines and there is theoretical and practical justification for it (i.e. the results are reliable). Recently, for example, Lenton (2015) uses a similar dependent variable. By using

this approach we are able to draw from a much larger student population (1.6 million student responses) and from a much broader range of universities than any previous studies. In BS specific studies, for example, Deshields et al. (2005) used 143 student questionnaires (years not stated, US-based students); Letcher and Neves (2010) 352 (between 2004-2008, US undergraduates); Bennett (2003) 377 (UK undergraduates); and Malik (2010) 240 (Pakistan-based students) (Malik et al., 2010). To date, therefore, in total around 1,100 student responses taken from different countries in different time periods have analysed drivers of BS student satisfaction. By contrast, our total sample consists of 245,469 BS student responses which we compare against over one million NBS responses (see Table 1).

Diagnostic and robustness tests

Our data exhibit some of the issues commonly encountered with Likert data (i.e. positive skewness, Tables 2,3). We therefore undertake a series of additional tests. This includes, firstly, use of quantile regression analysis, suggested as one suitable approach for data with skewed distributions. Secondly, we Winsorized our data at the 5% level (to remove outliers causing skewness). All results remained basically unchanged and consistent with our original OLS estimates.

Further, visual analysis of the predicted error terms (via histograms) suggests the normality assumption is met, albeit heteroscedasticity may be present. We addressed this issue by using robust standard errors as well as employing a number of other remedial approaches (i.e. logarithmic transformations), to explore the robustness of our results. We tested the degree of multicollinearity between explanatory variables using variance inflation factors (VIF) (with maximum values of 6). Owing to the relatively large sample size and relatively low VIF results we do not consider multicollinearity to be problematic to the interpretation of our results.

Omitted variables could potentially bias our estimates. The adjusted r squared in our model, however, at around 0.9, is very high: about 90% of the variance in satisfaction is explained by our explanatory variables. This is considerably higher than that found in similar previous satisfaction studies, which vary between 0.4 and 0.6. While it is possible we have omitted other important explanatory variables form our model, we think this improbable given its high overall explanatory power (based on the comprehensive 21 questions from the UK NSS). It could be that such things as course size influence satisfaction, or the prestige of the university (if it is a research focused Russell Group university in the UK, for example) influence satisfaction. We run models with these additional explanatory variables but find them all insignificant. [3]

Results

Results related to overall drivers of satisfaction

Course teaching (H1a,b,c,d)

Course teaching, perhaps unsurprisingly, is an important category driving overall satisfaction. The cumulative sum of the significant coefficients for questions 1-4 of the NSS questionnaire, for example, sum to 0.41 for BS courses (and 0.44 for NBS courses (Table 5)). All coefficients are significant (at the 5% level and above) and many highly so (at the 0.1% level). The combined impact of teaching (coefficients on questions 1-4) is considerably larger than for any of the other five remaining categories (i.e. assessment, academic support, organisation and management, learning resources and personal development, see Table 5). The second strongest

[3] This provides further justification for using the average of student responses at the course level, an approach which weights each course equally, regardless of size. Course size does not appear to be an important driver of satisfaction (a result we have also found at the level of individual modules in other research).

category, for example, is "personal development" (0.27), followed closely by organisation and management (0.26).

Although the coefficients on the teaching related questions are positive and significant, they do not all, however, register as being "strong" drivers when ranked against the other explanatory variables in the model. In fact, only H1a and H1d are supported, albeit the drivers on H1b ("staff have made the subject interesting" and H1c ("staff are enthusiastic about what they are teaching") are still moderate drivers (and both statistically significant).

Assessment and feedback (H2a,b,c,d, e)

Interestingly, the assessment and feedback category as a whole in the UK NSS population appears to have a relatively weak impact (the combined coefficients, for example, sum to 0.011). The category, however, conceals considerable variation in the coefficients. Care with interpretation is also required. Fair assessments and marking, for example, have a moderate impact on overall course satisfaction in the BS sample, supporting H1b. Feedback, however, appears to have limited impact (NSS questions 7, 8 and 9). H1c, proposing a moderate impact, is therefore not supported. Similarly, H2d and 2e are not supported: neither detail of feedback nor feedback clarifying thinking are strong drivers of satisfaction.

****TABLES 2, 3, 4 ABOUT HERE****

Differences in teaching, assessment and feedback related drivers in BS and NBS samples (H3a,b,c)

Table 2 shows that for question 1 on the NSS the BS coefficient is significantly larger, by 0.075 at the 1% significance level, for BS students. For question 4, by contrast, it is significantly lower, by -0.06 at the 0.1% significance level. BS students are less concerned about "intellectual stimulation". Rather, clarity of explanations is more important. This supports H3a and H3b. Fair assessment and marking, moreover, is a stronger driver of student satisfaction in

BS than NBS students. For BS students the impact of question 6 ("Assessment arrangements and marking have been fair") on overall perception of quality is considerably higher than for NBS students (0.1 compared to 0.05, almost double), supporting H3c. Question 6 ranks as the as the sixth most important determinant of satisfaction for BS students. By contrast, for NBS students it ranks eighth (Table 6).

Discussion

We first consider our broader findings regarding the main drivers of reported student satisfaction for BS students within the UK NSS survey as a whole. We then discuss the significance of our findings regarding differences in the drivers of reported satisfaction with quality for BS *vis a vis* NBS students.

The central importance of clarity of explanation, intellectual stimulation and organisation

In some ways it is reassuring to find that the most highly ranked drivers of satisfaction in the UK student undergraduate population are teaching related. Most students still perceive direct contact teaching time as one of the main benefits higher education has to offer (albeit ideas of exactly what constitutes teaching quality may vary between BS and NBS students).[4] These findings are broadly consistent with earlier research on student satisfaction (Broder & Dorfman, 1994; Hearn, 1985; Letcher & Neves, 2010; Thomas & Galambos, 2004). When we dig deeper into which aspects of teaching drive satisfaction, we find intellectual stimulation still registers very highly, in both BS (2nd place) and NBS students (also 2nd). Perception of course quality is strongly related to intellectual stimulation and clarity of explanation. These

[4] As Thomas and Galambos (2004) put it: "teaching and learning appear to have more effect on students' general satisfaction than the campus services and amenities on which uncritical consumerism might focus attention" (Thomas & Galambos, 2004, p. 263).

findings are positive, in so far as they suggest overall student satisfaction is linked to features of university teaching that we would expect also to be important for learning.

Interestingly, NSS question 15 "the course is well organised and running smoothly" (in the section "Course organisation and management" of the NSS survey) registers as the strongest driver of satisfaction for BS students (Table 6). This raises a further question: does the question mostly capture the administrative side of course organisation and management, or that involving interaction in classes with teaching staff? There are several pieces of evidence pointing towards the latter interpretation. Firstly, some other items in the organisation and management group more associated with the administrative side of course management (i.e. timetabling scheduling, communications regarding course changes) show no positive relationship with satisfaction (and even negative ones, Table 2). Secondly, additional factor analysis of the 21 survey items shows a strong loading on one teaching factor, with NSS question 15 on "smooth running of courses" falling into it.

Is this finding surprising? For most students, we would argue, first-hand experience of course organisation and management stems directly from their daily interaction with teaching staff (in the classroom or via academic advising) rather than with administrators. A significant component of the "organisation and management" element captured in the NSS survey thus likely reflects the efforts of teaching staff. This further reinforces findings regarding the importance of teaching quality, suggesting that it is not just what academics teach but also how they teach and manage their modules. Some existing research at the module (not course) level supports this viewpoint. Thomas and Galambos (2004), for example, have shown how teacher "preparedness" is a strong driver of satisfaction (at the module level). So, it might be reasonable to also expect a significantly positive impact of well organised classes on *course* satisfaction.

Our findings additionally suggest that aspects of teaching that may be considered more superficial in nature, such as an enthusiastic outward teaching demeanour, does not greatly influence satisfaction (because the coefficient on it is relatively small). The NSS data suggest that students typically value content, delivery and organisation more highly than enthusiasm, albeit enthusiasm is still not unimportant (Table 2). The high ranking of personal development as a satisfaction driver, moreover, is indicative that students recognise what they may gain from higher education. These findings are supported by earlier research. Letcher and Neves (2010), for example, identify "self-confidence" as the most important single factor explaining satisfaction in their business school sample. Thomas and Galambos (2004) also found that what most satisfied students was perceived "intellectual development" (Thomas & Galambos, 2004, p. 258).

The limited importance of timely, high quality assessment feedback

While many aspects of teaching delivery, such as intellectual stimulation and clarity of explanation, act as positive drivers of satisfaction, our findings regarding assessment and feedback, by contrast, give reason for concern. To date, comparatively little is known about how assessment shapes student satisfaction and our findings may be surprising for some. The insignificant or marginally negative coefficients on most of the assessment related variables suggests that promoting tighter marking turnaround deadlines, explaining upfront marking criteria more clearly, or giving more detailed feedback, may not greatly improve overall reported course satisfaction. In general, our findings imply that students are more concerned that their final mark reflects their efforts and capabilities and is "fair", rather than how (i.e. what feedback says) or when this mark is actually arrived at. These finding should be of some interest to UK government policy-makers responsible for developing the TEF as well as BS administrators and educators. Receiving adequate feedback is arguably of central importance to learning processes (O'Donovan, Rust, & Price, 2016). Written work which is assessed is an

important, possibly the most important means, by which students in higher education may receive critical feedback.

Interpreting these negative coefficients, of course, requires some care. Reverse causality in our model is an important consideration. It may be, for example, that those students who received feedback that has helped improve their understanding of a subject (i.e. question 9) tend to be weaker students and those, therefore, who are (on the whole) more prone to being dissatisfied with their courses. We cannot rule out this possibility. This being said, there are also valid reasons for believing that some negative relationships may exist. In the case of question 5 regarding clarity of assessment criteria, for example, being provided with long and detailed accounts relating to marking criteria is likely to be a distraction. Similarly, fast turn-around times (question 7) may lead to the perception (or reality) that student coursework or assessments have not been properly marked. In other words, rushing to provide feedback may not be helpful in improving satisfaction with quality.

Our results point towards the need for a more thorough investigation of the impact of assessment on perceptions of education quality. High quality feedback is essential for learning to take place. If, however, perceived course quality is not strongly influenced by the assessment and feedback drivers we identify here, policy-makers may need to think more carefully about the use of student satisfaction measures as indicators of quality teaching. If university ranking systems or policy-makers use overall student satisfaction to rate educational quality, this may end up inadvertently penalising the institutions that are those most actively engaged in best practice learning and teaching activities – i.e. giving detailed and timely feedback. This is because such schools will see little benefit to their overall rankings (based on overall satisfaction), despite sacrificing considerable resources to providing high quality assessment and feedback mechanisms.

Instrumental learning and reported satisfaction in UK business schools

As noted, instrumental learners are characterised as being more extrinsically driven than other learners (i.e. they study to get a good degree and enhanced career prospects). They typically focus on attaining qualifications not mastering the subject via "deep learning". They therefore have a preference towards clear guidance during their studies. It has been suggested, for example, they may exhibit "a high degree of dependence on tutors" and by implication they are less self-directed learners (Ottewill, 2003, p.189).

Our results do indeed show that BS students have a stronger preference for staff that can explain things well when compared with NBS students. By contrast, while Koris et al. (2016) argue that BS students also "value and identify with intellectual curiosity, critical thinking and introspection" (Koris et al., 2016, p.1), intellectual stimulation appears to be considerably *less* important to BS students than it is to NBS students. Our finding here is in line with Hearn's (1985) early empirical analysis of field differences. He compared satisfaction drivers in six different categories and found significant differences in drivers across fields. Specifically, he found that in the general category of what he termed "enterprising" majors, which included business and management studies, "course stimulation" was a weaker determinant than in other fields. These findings seem in keeping with a stronger instrumental profile in BS students.[5] Interestingly, we also found BS students placed a considerably larger emphasis on "fair" assessments and marking (NSS question 6).[6] It has been suggested that instrumental learners have "an unhealthy preoccupation with summative assessment" (Ottewill 2003, p.189). There may be some validity in this viewpoint, as our results show striking differences between BS and NBS groups in this regard. Whereas fair assessments are considered important, BS students

[5] Since Hearn (1985), unfortunately, there has been limited research on field differences (Broder & Dorfman, 1994). For example, no similar comparative empirical studies of the determinants of satisfaction in BS and NBS subjects exists, despite there being a number of studies on BS subjects alone.

[6] This is somewhat ironic given that evidence suggests they are also much more likely to cheat (Mccabe & Butterfield, 2006).

appeared rather indifferent about the feedback they received and when they received it (although, admittedly, no more so then NBS students).[7]

****TABLES 5, 6 ABOUT HERE****

Is the preoccupation with summative assessments or lesser concern with intellectual stimulation in BS students illogical or even surprising? In an era in which UK student fees have risen inexorably, some may consider it understandable for instrumental learners in the UK to exhibit the type of preferences we have identified here. Interestingly, further longitudinal analysis of the data from the UK NSS (not reported here) shows that the coefficient on the "fair grades and marking" variable (question 6) for BS students has increased considerably between 2005 and 2015. Using similar methodology as for our BS and NBS comparisons (composite dummy variables to test differences in coefficient values between the two periods) we found a large and statistically significant difference between the two coefficients in the two different periods. The importance placed on fair assessments by UK BS students has therefore been growing. Given the rapid increase in student fees, is it surprising that students have become much more concerned about the outcomes of their increasingly expensive personal investments in their university courses?

Our results may seem unsurprising for some, particularly those who have long commented upon the prevalence of instrumental learning in business schools (MacFarlane, 2015; Ottewill, 2003; Ottewill & MacFarlane, 2003). They also resonate with some studies in the management learning literature that have identified self-interested behaviours as being more prevalent among BS students (Podolny, 2009; Wang, 2011). Nonetheless, evidencing the strong tendency towards instrumentality at the UK national level in BS students, as we do here, may give pause

[7] This is rather surprising from a pedagogical point of view, as one might expect feedback to be central to learning processes. Indeed, the findings of significant negative coefficients on questions 5 ("The criteria used in marking have been clear in advance"), 7 ("Feedback on my work has been prompt") and 9 ("Feedback on my work has helped me clarify things I did not understand") may raise eyebrows.

for further reflection and possibly spur discussion of the phenomenon. Several implications follow.

Implications for policy-makers, management educators and business school administrators

Delivering higher levels of student satisfaction – as measured by the NSS – has become an increasingly important driver of education delivery in UK higher education today. This is because of increased competition and the elevation of student satisfaction which has become key to brand development (Corduas et al., 2016). Our results imply, however, that teaching styles which reward instrumental learning approaches are more strongly rewarded in the BS context. This is concerning, as much pedagogic research decries instrumental learning as inherently undesirable (Dyer & Hurd, 2016; Ottewill, 2003; Ottewill & MacFarlane, 2003). Some have talked about how it "strikes at the very heart of what has traditionally been regarded as the primary rationale of higher education" (Ottewill, 2003 p.195). Yet university administrators and managers, responding to market forces and university funders, now place increasing value on attaining ever higher levels of student satisfaction (MacFarlane, 2015). University league tables afford student satisfaction prominent roles in their ranking systems. Pressures to improve satisfaction scores and ranking are transmitted daily to staff working in UK business schools. Our findings, however, suggest careful consideration should be given to the impacts of using overall student satisfaction as a means of measuring teaching quality. It is possible such metrics, through market driven evolutionary processes, may lead to the growing predominance of approaches to teaching that support instrumental learning at the expense of what have traditionally been regarded as more desirable alternatives, ones involving deeper engagement and learning.

As well as the tendency towards instrumental learning, it is of concern that practices considered conventionally as central to learning often register as only weak drivers of student satisfaction. High quality assessment and feedback procedures, for example, are widely considered to be

vitally important for learning to take place. Yet our findings suggest it is mainly the fairness of assessments that students care about. Is it possible that the increased marketization of higher education, with the growing focus on student satisfaction, may progressively lead to the weakening of assessment and feedback procedures in BS courses? Will business schools that maintain a commitment towards high quality assessment and feedback practices gradually slip down the satisfaction rankings, as competitors focus their resources in areas that have stronger positive impacts on overall satisfaction (such as assessment fairness)? Government policy-makers, like those in the UK, need to carefully consider these possibilities. Educators and administrators in UK business schools, moreover, as guardians of the higher education system, need also to confront the possibility of this reality. In the final analysis, it may be that elevating students as consumers of higher education may not always be beneficial for their learning.

Conclusion

Our results raise some interesting and challenging questions regarding the growing reliance on student satisfaction measures as indicators of teaching quality in the UK. Do ranking systems and league tables based on student satisfaction encourage business schools to teach in ways that support instrumental learning? And might they, over the longer-term, undermine the quality of assessment and feedback practices employed in business schools? Given the elevation of student satisfaction as a driver of higher education delivery, it is clear that more research is needed to find out exactly what drives student satisfaction in business schools. Are these drivers of student satisfaction antithetical to or incompatible with student learning? Our novel attempt to explore satisfaction determinants using the UK NSS and its 1.6 million responses suggests some of them may be. Indeed, our results seem to lend support to those who warn of the McDonaldization of the university (Parker & Jary, 1995), in which course

standardization driven by a desire to provide what the customer-student (apparently) wants are privileged over more traditional academic values.

Limitations and future research

There are rich potential opportunities to further exploit the UK NSS data. This work, for example, could involve more detailed comparative analyses across specific subject areas. We used the JACs level 2, and contrasted BS and the very broad NBS category. It may make sense in future research to use a more specific range of subject categories that seem likely to be similar to BS students because they likely share instrumental motivation (e.g. law) or contrasting with BS students because instrumental motivation might seem less likely (e.g. philosophy). By doing so we will be able to get a better idea of the factors that shape the field differences we observed. Also, we have limited demographic data, as we use aggregated responses. BS students, as a population, may of course be different to NBS students (i.e. in terms of sex, age, nationality, etc.). While for the purposes of our key questions (differences between NBS and BS groups) this does not necessarily matter, it may be relevant in future studies. Future research could look more at how drivers have evolved over time. We could use earlier survey results to explore, for example, the introduction of student fees and how this influences the drivers of satisfaction. International comparisons, moreover, are needed. Do students in the US or other European countries exhibit similar differences in drivers of satisfaction? These are just some of the many areas requiring additional research.

Ideally, future empirical modelling will also employ ordered logit modelling using individual level response data. Some may consider our empirical approach to modelling the NSS Likert data as a limitation. The practice we use, however, is commonly used elsewhere and, as we have shown, there are also strong theoretical and practical arguments supporting it (Norman, 2010). We refer those still unconvinced to this literature. It should also be kept in mind that empirical research on student satisfaction drivers in business schools that we identified is based

on a cumulative total of around 1,000 student questionnaires (see methods section). The findings from our sample – around 250 times larger – marks a considerable step forward in trying to better understand the learning preferences of BS students and the possible implications.

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Table 1: Number of NSS responses by business school related topics at JAC level 2, 2012-16.

JAC	Number and subject	2012	2013	2014	2015	2016	Total
19	Economics	6,875	7,293	8,196	8,011	8,187	38,562
25	Business	16,696	17,969	19,489	19,013	18,723	91,890
26	Management	7,881	8,433	9,248	9,349	9,733	44,644
27	Accounting and Finance	8,405	9,476	10,479	10,455	10,654	49,469
28	Tourism etc.	5,396	5,716	6,203	5,517	5,572	28,404
	Total BS responses	45,253	41,594	53,615	52,345	52,869	245,676
All	All responses, BS + NBS	291,987	312,940	334,610	341,824	324,633	1,605,994
	BS as % of BS+NBS	15.5%	13.3%	16%	15.3%	16.3%	15.3%

Table 2: OLS regression results, dependent variable: "Overall, I am satisfied with the quality of the course".

	NSS Questions	(1)BS	(2)NBS	(3)BS +NBS, full sample	(4)Interactions
Teaching (1-4_)	**1** Staff are good at explaining things	0.144***	0.0694***	0.0810***	0.0734**
		(7.38)	(8.43)	(10.69)	(3.23)
	2. Staff have made the subject interesting	0.0483**	0.0878***	0.0822***	-0.0385
		(2.73)	(11.54)	(11.78)	(-1.86)
	3. Staff are enthusiastic about what they are teaching	0.0368*	0.0373***	0.0337***	-0.000897
		(2.38)	(5.54)	(5.47)	(-0.05)
	4. The course is intellectually stimulating	0.181***	0.242***	0.232***	-0.0608***
		(14)	(45.44)	(48.16)	(-4.04)
Assessment and feedback (5-9)	**5.** The criteria used in marking have been clear in advance	-0.0265*	-0.00929*	-0.0109**	-0.017
		(-2.42)	(-2.06)	(-2.61)	(-1.33)
	6. Assessment arrangements and marking have been fair	0.107***	0.0449***	0.0523***	0.0617***
		(9)	(8.77)	(11.1)	(4.44)
	7. Feedback on my work has been prompt	-0.0138	-0.00308	-0.0043	-0.0101
		(-1.50)	(-0.95)	(-1.41)	(-0.96)
	8. I have received detailed comments on my work	0.0113	0.00789	0.00836	0.00281
		(0.91)	(1.53)	(1.76)	(0.19)
	9. Feedback on my work has helped me clarify things I did not understand	-0.0117	-0.0320***	-0.0302***	0.0216
		(-0.85)	(-5.36)	(-5.51)	(1.35)
Academic Support	**10.** I have received sufficient advice and support with my studies	0.100***	0.153***	0.147***	-0.0525**
		(6.17)	(21.1)	(22.2)	(-2.75)
	11. I have been able to contact staff when I needed to	-0.00246	0.00915	0.00754	-0.0119
		(-0.20)	(1.73)	(1.55)	(-0.82)
	12. Good advice was available when I needed to make study choices	0.0299	0.0168*	0.0175**	0.0153
		(1.94)	(2.47)	(2.81)	(0.85)
	13. The timetable works efficiently as far as my activities are concerned	-0.0659***	-0.0413***	-0.0453***	-0.0238*
		(-7.58)	(-10.66)	(-12.77)	(-2.33)

	14. Changes in the course or teaching have been communicated effectively	-0.0138	-0.0155**	-0.0165***	0.0023
		(-1.18)	(-3.19)	(-3.69)	(-0.17)
	15. The course is well organised and is running smoothly	0.323***	0.320***	0.323***	0.000186
		(27.3)	(67.1)	(74.3)	(-0.01)
Learning Res.	**16.** The library resources and services are good enough for my needs	0.0456***	0.0397***	0.0409***	0.00558
		(4.81)	(10.95)	(12.09)	(0.51)
	17. I have been able to access general IT resources when I needed to	-0.00724	-0.00826	-0.0100*	0.00286
		(-0.56)	(-1.65)	(-2.15)	-0.19
	18. able to access specialised equipment, facilities, or rooms when needed	-0.0193	0.0197***	0.0163***	-0.0383*
		(-1.48)	(4.19)	(3.69)	(-2.55)
Pers. Dev.	**19.** The course has helped me to present myself with confidence	0.125***	0.115***	0.118***	0.00884
		(6.35)	(13.59)	(15.13)	(0.38)
	20. My communication skills have improved	0.0427*	0.0135	0.0199**	0.0293
		(2.28)	(1.76)	(2.81)	(1.35)
	21. As a result of the course, I feel confident in tackling unfamiliar problems	0.135***	0.131***	0.131***	0.00482
		(6.57)	(15.5)	(16.7)	(0.2)
	yr2013	-0.0104	-0.00477	-0.00548*	-0.00559*
		(-1.62)	(-1.65)	(-2.07)	(-2.11)
	yr2014	-0.00408	-0.00930**	-0.00846**	-0.00858**
		(-0.63)	(-3.19)	(-3.17)	(-3.22)
	yr2015	-0.0259***	-0.0296***	-0.0294***	-0.0291***
		(-4.12)	(-10.61)	(-11.47)	(-11.39)
	yr2016	-0.0283***	-0.0336***	-0.0331***	-0.0329***
		(-4.40)	(-11.74)	(-12.63)	(-12.55)
	_cons	-0.609***	-0.724***	-0.705***	-0.723***
		(-11.65)	(-32.45)	(-34.51)	(-32.85)
	Business School Dummy	…	…	…	0.104
					(1.71)
	N	2887	17167	20054	20054
	adj. R-sq	0.883	0.892	0.891	0.891

T statistics in parentheses, * p<0.05, ** p<0.01, *** p<0.001. Source: NSS surveys, 2012-16.

Table 3: NSS questions and their descriptive statistics.

NSS Questions					
The teaching on my course		Mean	Std. Dev.	Min	Max
1	Staff are good at explaining things	4.17	0.24	2.04	5
2	Staff have made the subject interesting	4.07	0.28	1.85	5
3	Staff are enthusiastic about what they are teaching	4.28	0.28	1.97	5
4	The course is intellectually stimulating	4.19	0.31	2.25	5
Assessment and feedback					
5	The criteria used in marking have been clear in advance	3.98	0.32	1.89	5
6	Assessment arrangements and marking have been fair	3.98	0.3	1.86	5
7	Feedback on my work has been prompt	3.73	0.43	1.34	5
8	I have received detailed comments on my work	3.87	0.4	1.76	5
9	Feedback on my work has helped me clarify things I did not understand	3.78	0.37	1.68	5
Academic support					
10	I have received sufficient advice and support with my studies	4.04	0.29	2.13	5
11	I have been able to contact staff when I needed to	4.26	0.29	1.9	5
12	Good advice was available when I needed to make study choices	4.05	0.29	1.92	5
Organisation and management					
13	The timetable works efficiently as far as my activities are concerned	4.09	0.33	1.69	5
14	Any changes in the course or teaching have been communicated effectively	3.98	0.41	1.38	5
15	The course is well organised and is running smoothly	3.91	0.46	1.22	5
Learning resources					
16	The library resources and services are good enough for my needs	4.18	0.38	1.65	5
17	I have been able to access general IT resources when I needed to	4.26	0.31	1.77	5
18	I have been able to access specialised equipment, facilities, or rooms when I needed to	4.11	0.33	1.64	5
Personal development					
19	The course has helped me to present myself with confidence	4.14	0.26	1.89	5
20	My communication skills have improved	4.27	0.25	2.15	5
21	As a result of the course, I feel confident in tackling unfamiliar problems	4.17	0.25	2	5
Overall satisfaction					
22	Overall, I am satisfied with the quality of the course	4.16	0.34	1.54	5

Table 4: Pairwise correlations.

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20	Q21	Q22
Q1	1																					
Q2	0.82	1																				
Q3	0.79	0.86	1																			
Q4	0.72	0.76	0.71	1																		
Q5	0.61	0.49	0.48	0.37	1																	
Q6	0.66	0.56	0.55	0.49	0.72	1																
Q7	0.57	0.52	0.53	0.44	0.61	0.62	1															
Q8	0.59	0.6	0.59	0.36	0.61	0.6	0.72	1														
Q9	0.64	0.63	0.59	0.44	0.65	0.7	0.72	0.88	1													
Q10	0.78	0.72	0.72	0.61	0.64	0.69	0.61	0.62	0.71	1												
Q11	0.67	0.58	0.62	0.59	0.47	0.56	0.52	0.42	0.49	0.74	1											
Q12	0.74	0.7	0.69	0.59	0.6	0.65	0.6	0.6	0.68	0.87	0.75	1										
Q13	0.54	0.48	0.47	0.48	0.42	0.48	0.39	0.37	0.41	0.52	0.51	0.5	1									
Q14	0.61	0.49	0.53	0.57	0.49	0.53	0.5	0.36	0.42	0.59	0.65	0.58	0.71	1								
Q15	0.68	0.55	0.58	0.64	0.53	0.57	0.53	0.39	0.44	0.63	0.68	0.6	0.69	0.89	1							
Q16	0.19	0.16	0.19	0.28	0.13	0.17	0.19	0.01	0.09	0.23	0.29	0.25	0.18	0.31	0.3	1						
Q17	0.24	0.21	0.22	0.32	0.18	0.21	0.22	0.06	0.15	0.3	0.34	0.31	0.22	0.32	0.32	0.76	1					
Q18	0.36	0.32	0.34	0.42	0.27	0.29	0.29	0.12	0.21	0.4	0.44	0.42	0.32	0.44	0.45	0.71	0.78	1				
Q19	0.65	0.66	0.61	0.58	0.54	0.49	0.47	0.49	0.54	0.69	0.51	0.68	0.41	0.44	0.49	0.26	0.31	0.4	1			
Q20	0.56	0.58	0.55	0.53	0.44	0.36	0.39	0.39	0.43	0.58	0.44	0.58	0.33	0.37	0.41	0.27	0.3	0.4	0.87	1		
Q21	0.65	0.64	0.61	0.65	0.49	0.49	0.47	0.42	0.51	0.68	0.54	0.67	0.41	0.48	0.53	0.31	0.36	0.46	0.87	0.84	1	
Q22	0.81	0.75	0.74	0.8	0.57	0.64	0.57	0.49	0.56	0.78	0.71	0.74	0.59	0.74	0.83	0.34	0.37	0.5	0.71	0.63	0.74	1

Table 5: Sums of the significant coefficients reported for the six NSS categories for BS/NBS students.

Cumulative sum of significant coefficients for the six different NSS categories			
	BS courses	NBS courses	BS and NBS courses
Teaching (questions. 1-4)	0.41	0.437	0.429
Assessment and feedback (5-9)	0.0805	0.0036	0.011
Academic support (10-12)	0.1	0.165	0.17
Organisation and Management (13-15)	0.257	0.263	0.261
Learning resources (16-18)	0.045	0.059	0.047
Personal development (19-21)	0.30	0.25	0.269

Source: Table 2.

Table 6: Ranking of drivers of satisfaction in BS and NBS subjects.

NSS Questions	(1)BS	NSS Questions	2)NBS
15. The course is well organised and is running smoothly	0.32***	15. The course is well organised and is running smoothly	0.32***
4. The course is intellectually stimulating	**0.18*** **	**4. The course is intellectually stimulating**	**0.24*** **
1 Staff are good at explaining things	0.14***	**10. I have received sufficient advice and support with my studies**	**0.15*** **
21. As a result of the course, I feel confident in tackling unfamiliar problems	0.14***	21. As a result of the course, I feel confident in tackling unfamiliar problems	0.13***
19. The course has helped me to present myself with confidence	0.13***	19. The course has helped me to present myself with confidence	0.12***
6. Assessment arrangements and marking have been fair	0.11***	2. Staff have made the subject interesting	0.088***
10. I have received sufficient advice and support with my studies	0.1***	**1 Staff are good at explaining things**	**0.07*** **
13. The timetable works efficiently as far as my activities are concerned	-0.067***	**6. Assessment arrangements and marking have been fair**	**0.045*** **
2. Staff have made the subject interesting	0.048**	**13. The timetable works efficiently as far as my activities are concerned**	**-0.041*** **
16. The library resources and services are good enough for my needs	0.046***	16. The library resources and services are good enough for my needs	0.038***
20. My communication skills have improved	0.0427*	3. Staff are enthusiastic about what they are teaching	0.037***
3. Staff are enthusiastic about what they are teaching	0.0368*	9. Feedback on my work has helped me clarify things I did not understand	-0.032***
5. The criteria used in marking have been clear in advance	-0.0265*	18. able to access specialised equipment, facilities, or rooms when needed	0.012***
12. Good advice was available when I needed to make study choices	0.0299	12. Good advice was available when I needed to make study choices	0.017*
8. I have received detailed comments on my work	0.0113	14. Changes in the course or teaching have been communicated effectively	-0.016**
11. I have been able to contact staff when I needed to	-0.00246	5. The criteria used in marking have been clear in advance	-0.0093*
17. I have been able to access general IT resources when I needed to	-0.00724	20. My communication skills have improved	0.014
9. Feedback on my work has helped me clarify things I did not understand	-0.0117	11. I have been able to contact staff when I needed to	0.0092
7. Feedback on my work has been prompt	-0.0138	8. I have received detailed comments on my work	0.00789
14. Changes in the course or teaching have been communicated effectively	-0.0138	7. Feedback on my work has been prompt	-0.00308
18. able to access specialised equipment, facilities, or rooms when needed	**-0.019**	**17. I have been able to access general IT resources when I needed to**	**-0.00826**

Notes: questions in bold highlight statistically significant differences in drivers of satisfaction between BS and NBS